

Exhibit 2

Charted Claim:

Method Claim: 1

US10447544B2	NetFlow Traffic Analyzer (“Accused Product”)
1. A method comprising: receiving a request for a quality of service (QoS) associated with an application executing on a network, the QoS expressed as requested QoS parameters;	<p>The accused product practices a method comprising: receiving a request for a quality of service (QoS) associated with an application executing on a network, the QoS expressed as requested QoS parameters (e.g. queue limit, packet weight, etc.).</p> <p>As shown below, the accused product is a NetFlow Traffic Analyzer. Its capacity planning feature forecasts the bandwidth required to meet Quality of Service (QoS) service levels for business-critical applications on a network. The forecasts are used to modify QoS policies and improve traffic flow. The user can specify QoS policies to shape different classes of network traffic. A policy is configured using different parameters, for example, Queue Limit and Packet Weight.</p>



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NetFlow Traffic Analyzer

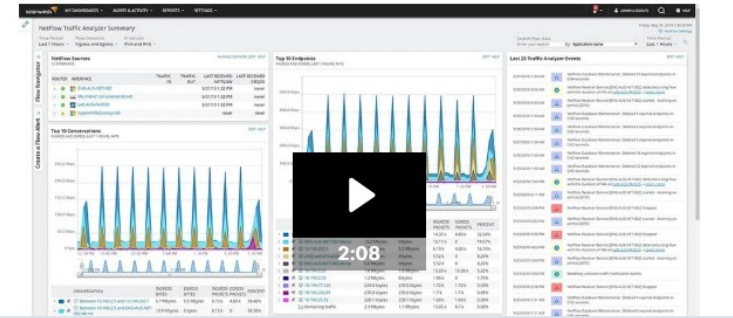
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NetFlow Traffic Analyzer

NetFlow traffic and bandwidth monitoring software, a key feature of SolarWinds Observability Self-Hosted.



<https://www.solarwinds.com/netflow-traffic-analyzer>

NetFlow Traffic Analyzer

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Get valuable insights into network and bandwidth usage

SolarWinds Observability Self-Hosted has powerful NetFlow management capabilities and comprehensive monitoring tools designed to translate granular detail into easy-to-understand graphs and reports. It's NetFlow traffic analyzer helps you more clearly identify the largest resource draining your bandwidth.

[Learn More](#)

NetFlow Application - Port 0 (0)
Last 1 Hours - Ingress -

Traversing through EAST-2821-WAN

CREATE A FLOW ALERT [HELP](#) <<

Netflow Source

The alert will trigger on flow data received from Node EAST-2821-WAN.

Alert Name

NTA Alert on EAST-2821-WAN

Severity

Notice

Trigger Condition

Application traffic exceeds threshold

Ingress Traffic > Mbps

The alert will check the last 5 minutes of Flow data.

For traffic matching the current Flow Navigator filters:

Included Application: Port 0 (0)

There are more options available. Open this alert in Alert wizard to configure email sending, time frames, and more.

☐ Open this alert in Alert wizard before saving.

CREATE ALERT

Application Details

Application

Port 0

Port

0

Total Traffic

18.6 Gbytes Last 1 Hours

Total Packets

2,008M Packets Last 1 Hours

Top 5 Applications

INGRESS, LAST 1 HOURS, RATE (KBPS)

NetFlow



<https://www.solarwinds.com/netflow-traffic-analyzer>

NetFlow Traffic Analyzer

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Features

Datasheet

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Network congestion management

Resolve network issues fast with our SolarWinds Observability Self-Hosted network congestion solution.

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What is NetFlow?

NetFlow is a network protocol developed by Cisco for collecting IP traffic information and monitoring network flow.

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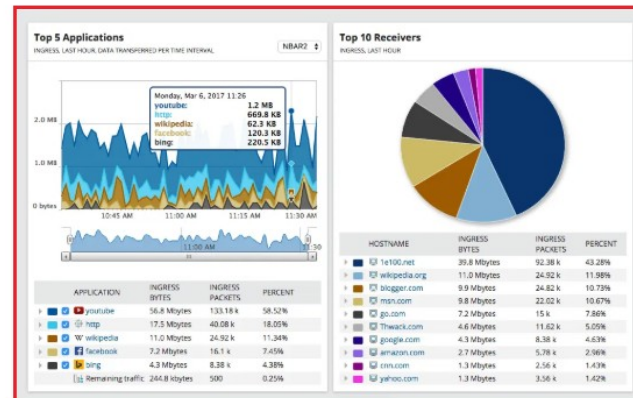
Network bandwidth monitoring

Monitor network bandwidth in real time to identify bottlenecks, optimize performance, and help ensure smooth service delivery.

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<https://www.solarwinds.com/netflow-traffic-analyzer>

NetFlow Traffic Analyzer

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Quantify bandwidth consumption for critical apps

NetFlow Traffic Analyzer with QoS Testing delivers detailed insights regarding which applications are eating up the most bandwidth, so that you can save space for the tools that really count. You'll be able to [quantify bandwidth consumption](#) for critical applications, while using network QoS reporting to manage network traffic and significantly improve user experience for your business.

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"It's just the best network monitoring tool in the market!"



<https://www.solarwinds.com/netflow-traffic-analyzer/use-cases/network-qos-report#anchor2>

The third and most effective option includes leveraging [bandwidth monitoring software](#) to analyze network and device-specific bandwidth usage in real time with minimal manual efforts. It provides granular visibility into your organization's current and future bandwidth requirements by offering detailed consumption reports and visualizations.

<https://www.solarwinds.com/resources/it-glossary/bandwidth-consumption>

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Collect Metrics Gather Past Data Customize Alerts Isolate Events Compare Data

Get More on Real-Time Network Monitoring

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What does real-time network monitoring software do? >

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How does real-time network monitoring work in NPM? >

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NPM is also built to calculate capacity usage trends with historical data using peak calculation to forecast trends using daily maximum values and average calculation using daily average values to promote more accurate forecasting.

After collecting metrics, NPM is designed to automatically generate detailed network topology maps. These maps are designed to update automatically without user intervention, saving you time and reducing errors while promoting accuracy. Using NPM, you can build maps from scratch, import auto-generated maps, or customize pre-existing map templates using intuitive features like drag-and-drop and double-clicking.

<https://web.archive.org/web/20240416004232/https://www.solarwinds.com/network-performance-monitor/use-cases/real-time-network-monitoring>

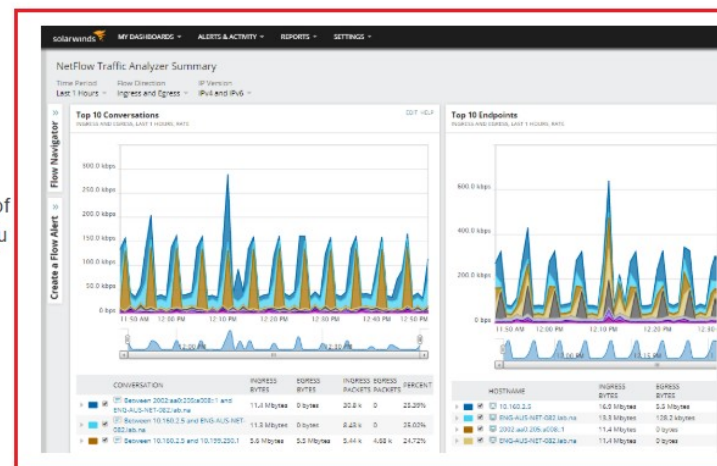
Decongest your network and improve flow using customizable network traffic reports

If your enterprise does business over video chat, poor voice or video quality caused by network congestion can hurt your productivity. NTA helps you improve traffic flow and enhance end-user experience with numerous QoS features. This network congestion solution lets you segment traffic by Class of Service methods and compare pre- and post-policy CBQoS class maps, so you can optimize your policies. Also, QoS reporting helps you verify the effectiveness of your policy over time.

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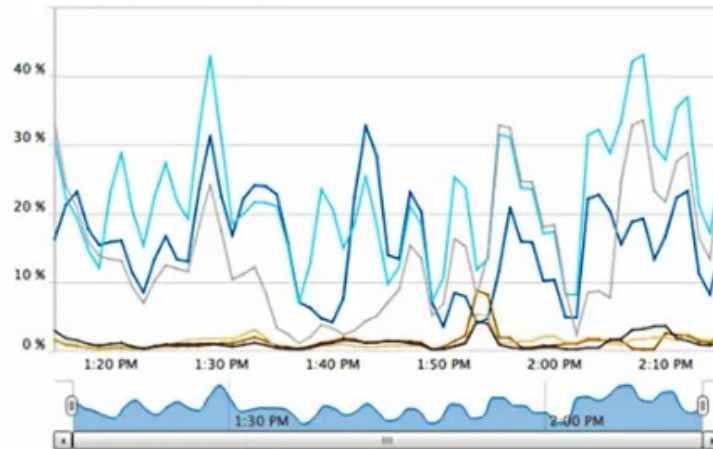
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CBQoS Pre-Policy Class Map

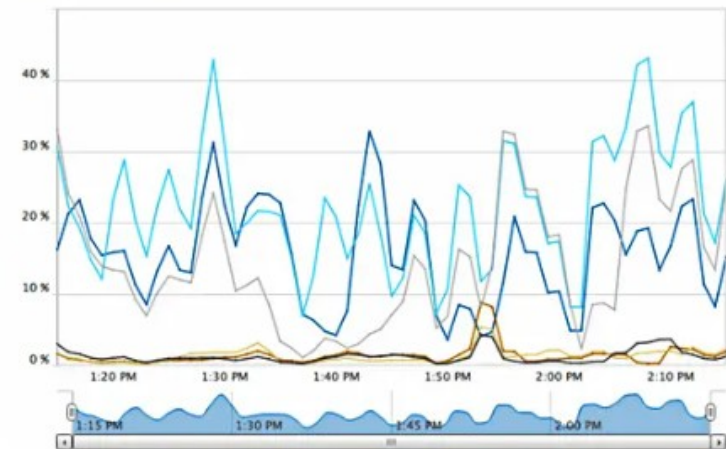
BOTH, LAST 1 HOURS, % OF CLASS UTILIZATION



CLASSNAME	AVERAGE	LAST POLLED
LAN to WAN		
<input checked="" type="checkbox"/> class-default	22.33 %	0.22 %
<input type="checkbox"/> Best Effort	6.86 %	0.32 %
Important		
<input checked="" type="checkbox"/> class-default	15.57 %	0.80 %
<input checked="" type="checkbox"/> Low Delay	14.37 %	0.10 %
Internet		
<input type="checkbox"/> Low Delay	1.93 %	0.04 %

CBQoS Post-Policy Class

BOTH, LAST 1 HOURS, % OF CLASS UTILIZATION



CLASSNAME	AVERAGE	LAST POLLED
LAN to WAN		
<input checked="" type="checkbox"/> class-default	22.33 %	0.22 %
<input type="checkbox"/> Best Effort	0.66 %	0.13 %
Important		
<input checked="" type="checkbox"/> class-default	15.57 %	0.80 %
<input checked="" type="checkbox"/> Low Delay	14.37 %	0.10 %
Internet		
<input type="checkbox"/> Low Delay	1.93 %	0.04 %

<https://www.solarwinds.com/netflow-traffic-analyzer/use-cases/network-qos-report#anchor0>

```
router#enable
Password:*****
router#configure terminal
router2950(config)# policy-map GOLD
router2950(config-pmap)# class CRM
router2950(config-pmap-c)# bandwidth 3000
router2950(config-pmap-c)# queue-limit 30
router2950(config-pmap-c)# exit
router2950(config-pmap)# class DataCenter
router2950(config-pmap-c)# bandwidth 2000
router2950(config-pmap-c)# exit
router2950(config-cmap)# exit
```

Policy is created

Match class to assign marking

Specify characteristics for the class

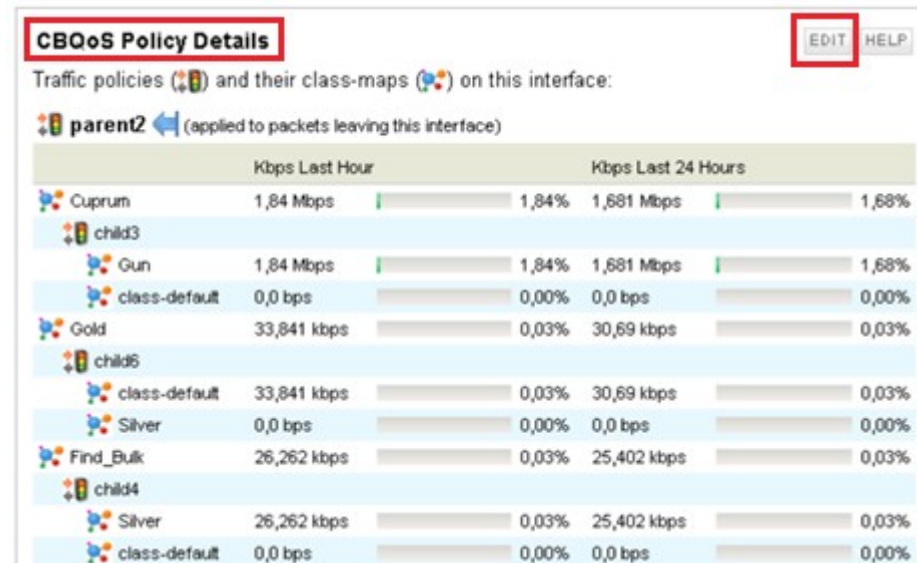
https://www.solarwinds.com/assets/solarwinds/swresources/tech-tip/configure_qos_on_cisco_routers.pdf

Mapping a Class to a Policy

In order to map a class to a policy, you must first create the class, then the policy. Next, the class and policy must be associated. Thereafter, the action being performed must be defined to the traffic group under each class. Some examples of characteristics are:

- Bandwidth - Traffic associated to this class has a guaranteed bandwidth
- Packet Weight - Packet drop does not happen if a weight is specified
- Queue Limit - Maximum number of packets that can be in the queue

https://www.solarwinds.com/assets/solarwinds/swresources/tech-tip/configure_qos_on_cisco_routers.pdf



https://documentation.solarwinds.com/en/success_center/nta/content/nta-viewing-cbqos-data-sw1241.htm

Class-Based Quality of Service (CBQoS) is an SNMP-based, proprietary Cisco technology available on selected Cisco devices that gives you the ability to prioritize and manage traffic on your network. Using policy maps, also known as policies, the different types of traffic on your network are categorized, and then given a priority. Based on assigned priorities, only specified amounts of selected traffic types are allowed through designated, CBQoS-enabled devices.

https://documentation.solarwinds.com/en/success_center/nta/content/nta-viewing-cbqos-data-sw1241.htm

	<p><u>SolarWinds® NetFlow Traffic Analyzer</u></p> <p>With SolarWinds NetFlow Traffic Analyzer (NTA), you can view network traffic segmented by classes and ensure that critical and delay-sensitive traffic, such as voice or video is prioritized and isn't dropped. In addition, it provides by-the-minute data required to monitor the bandwidth of each critical QoS segments. Further, it measures the effectiveness of your QoS policies by analyzing traffic before and after application. NTA easily quantifies bandwidth consumption for your critical applications.</p> <p>Some QoS reports that can be obtained from NTA are:</p> <ul style="list-style-type: none"> • <u>Obtain details about QoS policies applied to an interface, including nested policies and direction</u> • Information on the amount of traffic before and after the effect of each QoS policy • Pre and post policy statistics available for each class, as well as for nested policies • <u>Drop traffic details – Amount of traffic dropped on an interface per QoS policy, including each QoS class</u> • Validate the performance of your QoS policies <p>https://www.solarwinds.com/assets/solarwinds/swresources/tech-tip/configure_qos_on_cisco_routers.pdf</p>
obtaining operating parameters of the network;	<p>The accused product practices obtaining operating parameters of the network (e.g., bandwidth).</p> <p>As illustrated below, the NetFlow collectors obtain network traffic data for analysis.</p>

NetFlow Traffic Analyzer

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Get More on NetFlow Collector

Do you find yourself asking...

What is a NetFlow collector?

How does a NetFlow collector work?

Why is a NetFlow collector important?

How does NetFlow collection work in NTA?

Which vendors can NTA collect data from?

NetFlow is a protocol developed by Cisco Systems used to record statistical, infrastructure, routing, and other information about traffic flows passing through a NetFlow-enabled router or switch. A NetFlow collector is part of a flow monitoring system designed to receive, process, and store IP traffic data packets from these network devices.

Once the data has been properly formatted, NetFlow collectors forward the data to another application for analysis. Analyzing NetFlow data can reveal valuable insights into infrastructure, routing, and performance, but requires three primary tools, one of which is a flow collector. These tools are:

1. **NetFlow exporter:** A NetFlow-enabled device generating flow records containing information about IP traffic and exports these flow records to a flow collector
2. **NetFlow collector:** Receives flow records from the various exporters, then processes and stores the data for analysis
3. **NetFlow analyzer:** Translates flow data into charts, graphs, tables, and other visualizations providing an at-a-glance understanding of network status and performance

<https://www.solarwinds.com/netflow-traffic-analyzer/use-cases/netflow-collector>

NetFlow collectors receive IP traffic packets from one or more NetFlow-enabled export devices, then ingest, pre-process, and store the data before sending it to a NetFlow analyzer. The granular steps involved include:

- Collecting network flow UDP datagrams from the routers and switches with NetFlow enabled
- Translating binary network flow into a textual or numeric format
- Reducing data volume by aggregating, collating, correlating, and selectively filtering flow data
- Saving flow data in easily transmitted files or SQL databases, which is then connected to a NetFlow analyzer application

<https://www.solarwinds.com/netflow-traffic-analyzer/use-cases/netflow-collector>

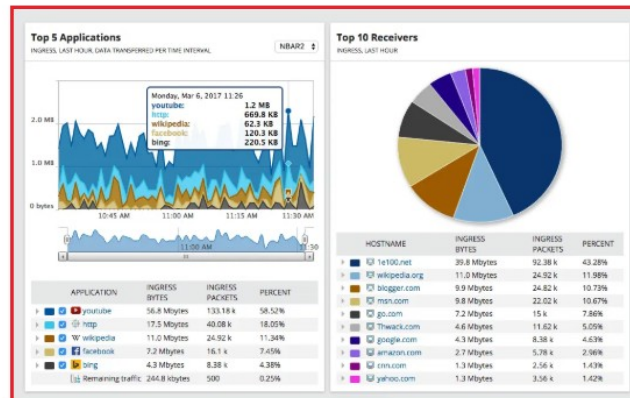
NetFlow collector software plays a critical role in the NetFlow monitoring and analysis process, making it possible for you to gain deeper understandings of network flow, traffic, and bandwidth consumption.

Collecting flow traffic data is the first step to gaining the visibility and actionable insights to allow more effective management of users, applications, devices, and services on a network. NetFlow collectors can also correlate flow data, making them a necessary part of troubleshooting problems related to network traffic across devices. Altogether, this combination of tools and services can help you streamline your network and security monitoring strategies for greater efficiency and effectiveness.

<https://www.solarwinds.com/netflow-traffic-analyzer/use-cases/netflow-collector>

	<p>Using NetFlow collector software can also significantly increase the efficiency of network operations. Manually performing NetFlow traffic analysis can be inefficient, requiring more time to produce results with far less accuracy and granular specificity. <u>NetFlow collectors can streamline the process by gathering traffic packets from one or more data sources, and efficiently normalizing and consolidating this information. so it's organized and usable for analysis.</u> Since network collectors can correlate data metrics by IP address, protocol, or port, this can also enable faster insights into how different network components interact and are affected by flow patterns to help teams pinpoint which devices and services are bottlenecks on the network, in addition to more easily uncovering the root cause of a traffic slowdown.</p> <p>https://www.solarwinds.com/netflow-traffic-analyzer/use-cases/netflow-collector</p>
<p>modeling traffic for a group of flows in the network as probability waves based at least in part on the operating parameters to generate a model of the traffic including model flows;</p>	<p>The accused product practices modeling traffic for a group of flows in the network as probability waves (e.g. binary on-off form of the statistical estimations) based at least in part on the operating parameters (e.g. bandwidth) to generate a model of the traffic including model flows.</p> <p>As shown below, the accused product uses the current and previous state of the network to model traffic flows, for example, modelling the effect of congestion between sites. The model forecasts the network resources required to meet the QoS service level for an app.</p>

NetFlow Traffic Analyzer

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<https://web.archive.org/web/20240416004232/https://www.solarwinds.com/network-performance-monitor/use-cases/real-time-network-monitoring>

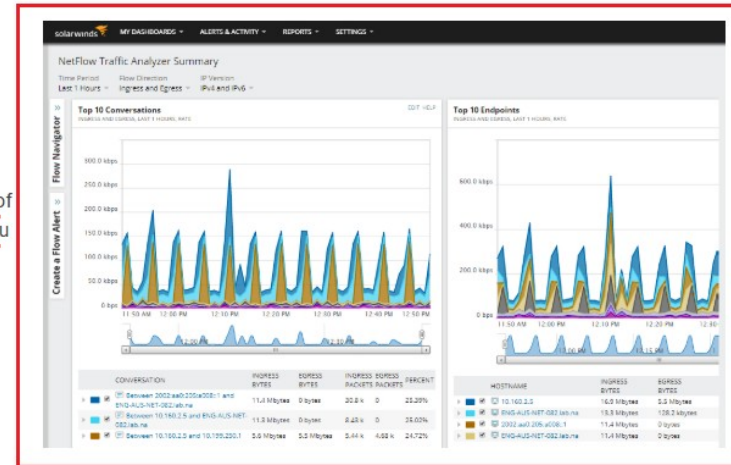
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NetFlow Traffic Analyzer

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Plan Bandwidth Capacity

Find the Source of Usage

Analyze Network Traffic

Identify Top Talkers

View Detailed Reports

Determine the Source of Bandwidth Usage by Using Detailed Bandwidth Monitoring

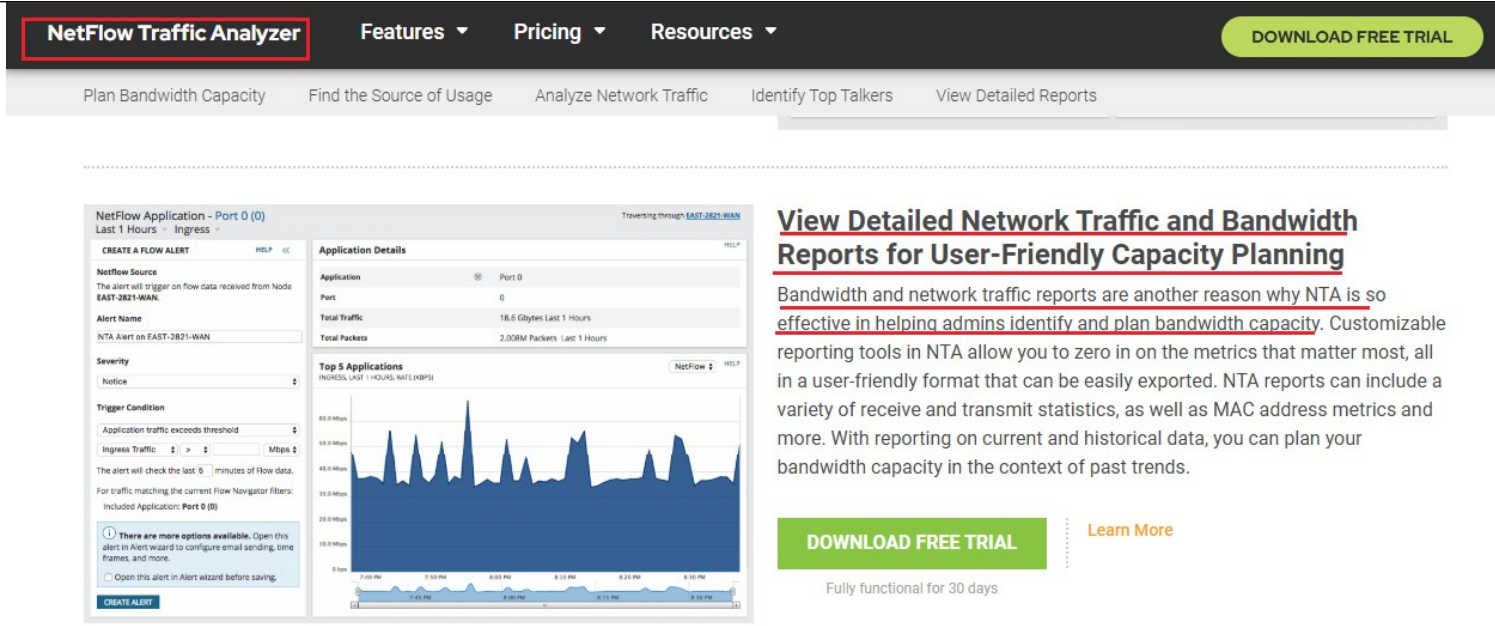
With NTA, you can perform custom network analytics for easier bandwidth capacity planning. NTA allows you to measure bandwidth usage per application, and set alerts that trigger when bandwidth crosses a customizable threshold. You can also measure bandwidth usage for IP groups, to track traffic between your most important sources and destinations. NTA's intuitive interface allows you to view bandwidth usage and graphical data from your NTA control center.

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<https://web.archive.org/web/20230716102726/https://www.solarwinds.com/netflow-traffic-analyzer/use-cases/bandwidth-capacity-planning>

	 <p>https://web.archive.org/web/20230716102726/https://www.solarwinds.com/netflow-traffic-analyzer/use-cases/bandwidth-capacity-planning</p>
<p>determining QoS parameters for the network, wherein the QoS parameters for the network are expressed in terms of properties of the probability waves; and</p>	<p>The accused product practices determining QoS parameters for the network, wherein the QoS parameters for the network are expressed in terms of properties of the probability waves (e.g. binary on-off form of the statistical estimations).</p> <p>As illustrated below, the accused product uses the parameters from capacity planning and trend analysis, it forecasts the bandwidth criteria needed to meet the QoS targets, for example, generating a policy for sizing and controlling network queues.</p>

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https://www.solarwinds.com/assets/solarwinds/swresources/tech-tip/configure_qos_on_cisco_routers.pdf

	<p><u>Mapping a Class to a Policy</u></p> <p><u>In order to map a class to a policy, you must first create the class, then the policy. Next, the class and policy must be associated. Thereafter, the action being performed must be defined to the traffic group under each class. Some examples of characteristics are:</u></p> <ul style="list-style-type: none"> • <u>Bandwidth</u> - Traffic associated to this class has a guaranteed bandwidth • <u>Packet Weight</u> - Packet drop does not happen if a weight is specified • <u>Queue Limit</u> - Maximum number of packets that can be in the queue <p>https://www.solarwinds.com/assets/solarwinds/swresources/tech-tip/configure_qos_on_cisco_routers.pdf</p>
controlling an operational condition of the network in accordance with the model, thereby controlling the QoS parameters for the network to satisfy the requested QoS parameters.	<p>The accused product practices controlling an operational condition of the network in accordance with the model, thereby controlling the QoS parameters for the network (e.g. bandwidth criteria) to satisfy the requested QoS parameters (e.g. queue limit, packet weight, etc.).</p> <p>As shown below, the users can apply a QoS policy to a class of traffic that is used to both configure and monitor the network to ensure the QoS parameters are being met for networked applications.</p>

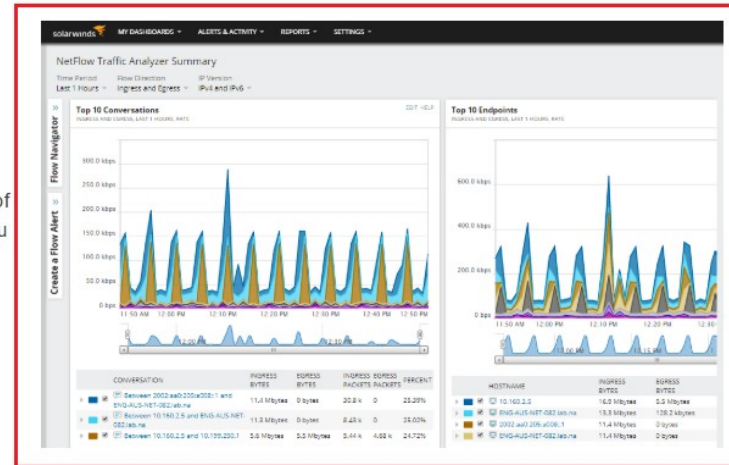
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<https://www.solarwinds.com/assets/solarwinds/swresources/tech-tip/>

[configure_qos_on_cisco_routers.pdf](#)

CBQoS Monitoring: Use an advanced monitoring tool that can query, “WRITE the name of the MIB,” for pulling information on the class based QoS policies you have created. Querying the QoS MIB will provide information on the pre and post policy traffic statistics and queuing. In turn, you can validate the performance of your QoS policies and determine if the policies created are performing as expected.

https://www.solarwinds.com/assets/solarwinds/swresources/tech-tip/configure_qos_on_cisco_routers.pdf